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GLASS WASHING AND STERILIZING MACHINE

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2 Sheets-Sheet 1

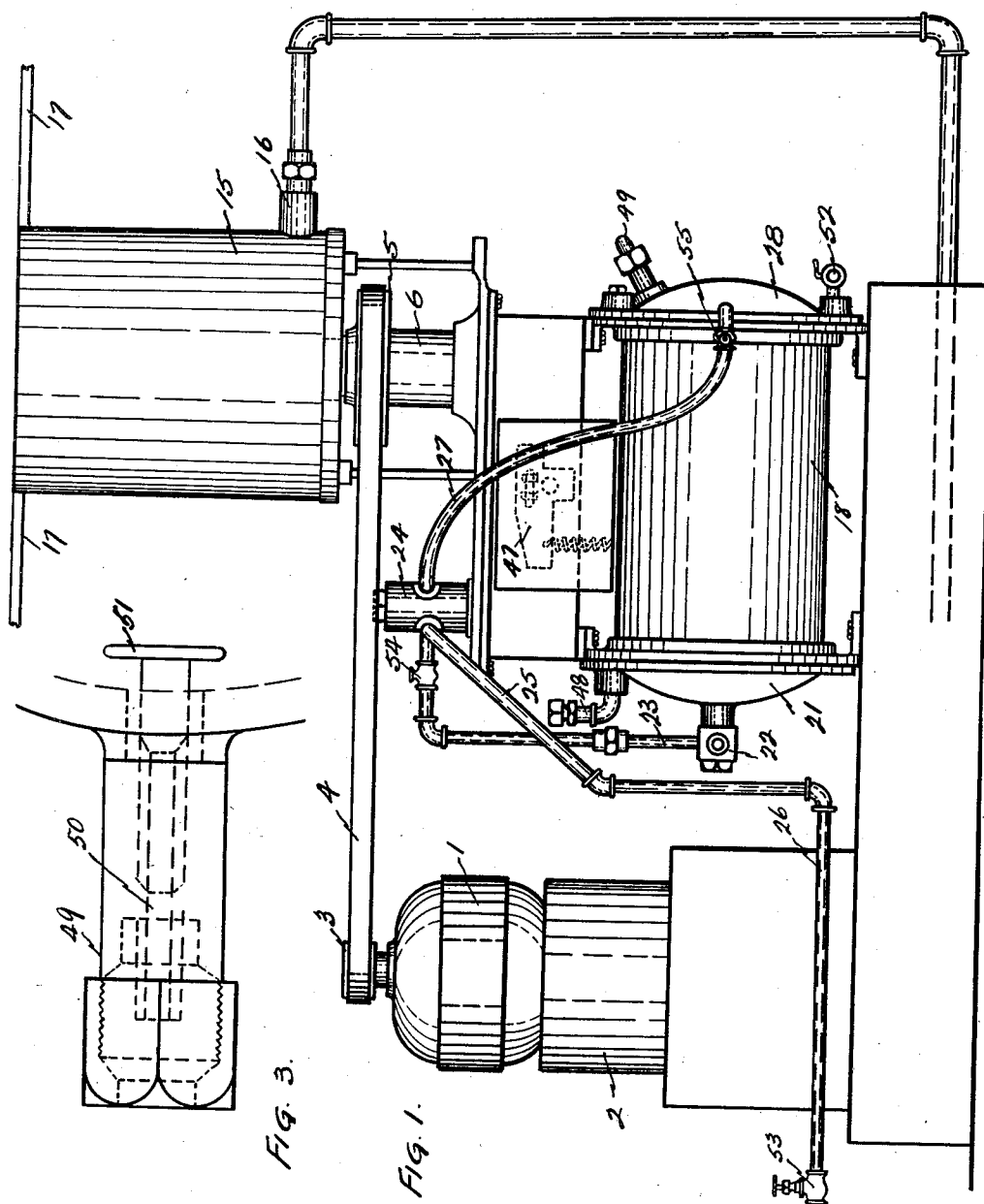


Fig. 3.

Fig. 1.

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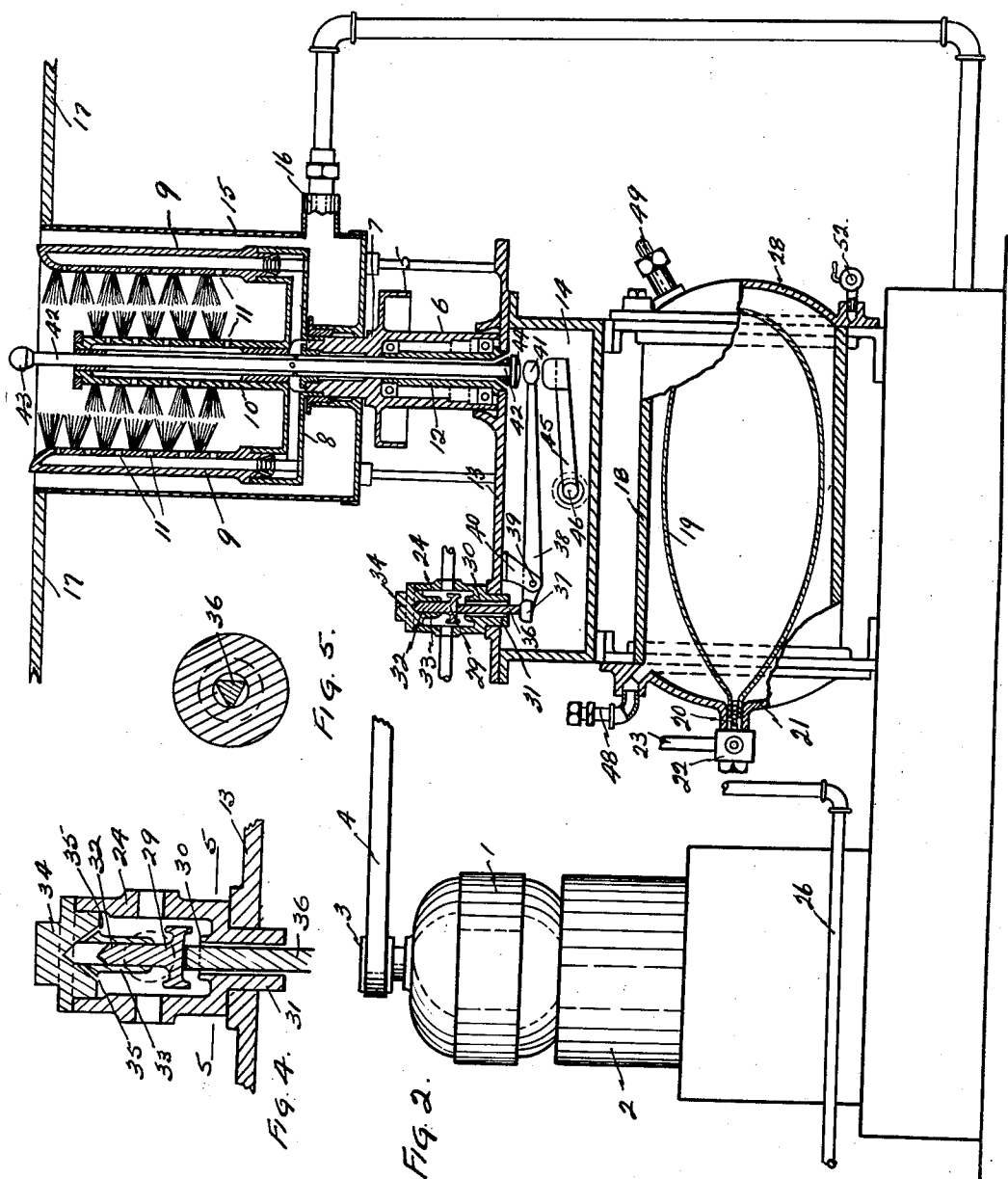
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GLASS WASHING AND STERILIZING
MACHINEFrank E. Mitchell, Vancouver, British Columbia,
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Application August 22, 1935, Serial No. 37,401

2 Claims. (Cl. 299—85)

This invention relates to power-driven glass washing and sterilizing machines designed especially for the speedy washing, cleansing and sterilizing of glasses used in places of public resort.

One of the particular objects of my invention is to provide a machine as nearly automatic in operation as possible other than the actual positioning of the glasses or tumblers upon the revolving brushes, and with this particular object in view, I have designed a machine wherein, when a tumbler is positioned upon the brushes, the machine is started, the water flow is opened and a measured amount of sterilizing liquid admitted into the water stream which is discharged for the actual washing of each glass, and when the glass is removed from the brushes the machine is stopped.

By suitable alteration of the brush members of the machine, it may be adapted to wash and cleanse any type or shape of glass in ordinary use.

The machine is simple in operation and silent in use and requires a minimum of manual attention to keep in proper order, and other than charging the machine with sterilizing fluid, very little attention is required to maintain the machine in effective working order.

With the foregoing enumerated features and objects in view I have invented the glass washing and sterilizing machine which is the subject matter of this application and which is further described in the following specification and illustrated in the accompanying drawings forming part of this application, in which:

Figure 1 is a side elevation of the machine illustrating the general assembly of the parts, driving motor, washing tank, piping connections and control switch.

Figure 2 is a general cross section of Figure 1 illustrating the main constructional details of the machine.

Figure 3 is an enlarged detail view of gauge showing valve stem with flat head.

Figure 4 is an enlarged detail view of valve in injection chamber.

Figure 5 is a cross section taken on line 5—5 of Figure 4 showing triangular push rod.

In these drawings like numerals indicate like parts, and the numeral 1 indicates a vertical electric motor mounted upon a suitable base 2 to position the motor at the desired height.

The motor 1 has a pulley wheel 3 driving through the belt 4 the pulley 5 which is integral

with a ball bearing mounted sleeve 6 forming an extension of the pulley 5.

Above the pulley 5 and likewise integral with it is a hollow shank 7, upon which is mounted a hollow cross arm 8 carrying vertical brush spindles 9 at the outer ends thereof. Mounted in the center of the cross arm 8 is a vertical brush spindle 10.

The brush spindles 9 and 10 are hollow and are perforated with a large number of small apertures 11 to permit of the escape of water therethrough.

The passages on the inside of the spindles 9 and 10 register with the passage formed in the hollow cross arm 8, which in turn communicates with the hollow shank 7.

The pulley 5 and bearing sleeve 6 are mounted upon a hollow bearing spindle 12 secured adjacent one end and upon the top cover plate 13 of a rectangular liquid mixing chamber 14.

The passage on the inside of the bearing spindle 12 communicates with the inside of the mixing chamber 14 and with the passage formed in the hollow shank 7, which in turn is connected with the passage formed in the hollow cross arm 8 to which the hollow brush spindles 9 and 10 are connected. Hence there is a direct passage from the liquid mixing chamber 14 to the brush spindles 9 and 10.

The cross arm 8 and brush spindles 9 and 10 are mounted in a metal bowl 15 comprising a washing chamber which has an outlet 16 for drainage. The bowl 15 is suitably mounted in a drain board 17 flush with the top thereof.

The rectangular mixing chamber 14 is mounted upon the top of a cylindrical chamber 18 forming the main sub-structure of the machine. Inside the chamber 18 is fitted a rubber bladder 19, the neck of which is fitted upon a spigot 20 positioned in the centre of one of the end covers 21 of the chamber 18.

The spigot 20 is connected to a fitting 22 upon the outside of the end cover 21, which in turn is connected by the pipe 23 to an injection chamber 24 mounted upon the cover plate 13 of the mixing chamber 14 positioned above the cylindrical chamber 18.

The injection chamber 24 is provided with three pipe connections, one for the pipe 23 connecting with the spigot 20, one for the pipe 25 connecting with a pressure water supply 26, and one for the pipe 27 connecting with the end cover 28 of the cylindrical chamber 18.

The last mentioned pipe 27 communicates

through the end cover 28 directly with the inside of the cylindrical chamber 18.

Fitted inside the injection chamber 24 is a valve 29 which seats upon a valve seat 30 formed in the bottom of the injection chamber 24.

The injection chamber 24 has a boss 31 formed at its lower end, which fits into an aperture formed in the top cover plate 13 of the mixing chamber 14.

The valve 29 has a vertical stem 32 which is slidable in a dependent guide 33 formed upon the inside of the cover or top 34 of the injection chamber 24.

The upper end of the stem 32 within the guide 33 is coned to fit snugly into the upper end of the guide 33.

Apertures or ports 35 are drilled into the bottom of the cover 34 terminating at the inside end of the guide 33, the purpose of which is to permit the water pressure upon the inside of the injection chamber 24 being exerted against the upper end of the valve stem 32 to seat the valve 29 firmly upon its seat 30.

The valve seat 30 and boss 31 are drilled to form a guide for a slidable push rod 36, the top of which contacts the underside of the valve 29 to unseat it when the push rod 36 is raised in the guide formed in the boss 31.

The lower end of the push rod 36 rests upon one end 37 of a pivoted lever 38 mounted upon the underside of the cover plate 13 of the mixing chamber 14.

The lever 38 is pivoted at 39 in a pair of lugs 43 formed upon the underside of the cover plate 13.

The opposite end 41 of the lever 38 is positioned directly under the lower end of a push rod 42 mounted within the vertical brush spindle 10 and extending through the latter into the hollow cross arm 8 and shank 7, and then through the hollow bearing spindle 12 into the mixing chamber 14.

The upper end of the push rod 42 projects above the top of the centre vertical brush spindle 10 and is fitted with a suitable contact member 43 for the inside bottom of glasses to contact with and depress to cause the machine to operate.

The lower end of the push rod 42 has a bulbous end 44 to allow it contacting the end 41 of the lever 38 throughout its limited arc of movement.

Positioned below the lever 38 and also upon the inside of the mixing chamber 14 is another lever 45 pivoted upon a stem 46 extending through one side of the mixing chamber 14.

The outer end of the stem 46 is connected to a suitable operating switch 47 installed upon the outside of the mixing chamber 14 for controlling the operation of the electric motor 1.

Upon the end cover 21 of the cylindrical chamber 18 is fitted a filling plug 48 through which the filling of the chamber 18 with a chemical solution is effected.

Upon the opposite end cover 28 is fitted a glass gauge 49 for indicating whether the chamber 18 contains sufficient solution for the operation of the machine.

This gauge 49 is provided with a valve stem 50 slidable upon the inside of the gauge glass which has a flat head 51 positioned upon the inside of the end cover 28, the purpose of which will be disclosed in the recital of the operation of the machine to follow.

The end cover 28 is also provided with a drainage opening at the bottom thereof to which is fitted a draw-off valve 52.

A shut-off valve 53 is installed at any convenient position in the pressure water supply line 26 and is left in the open position when the machine is in operation.

A check valve 54 is installed in the pipe line 23, preferably adjacent the injection chamber 24, in such a manner that no flow can be set up in the pipe 23, except in a direction away from the injection chamber 24.

A needle control valve 55 is installed in the pipe 27 intermediate the end cover 28, and the injection chamber 24 for regulating the flow of chemical solution. The pipe 27 in practice is of much smaller diameter than that of the pipe 23.

It is to be particularly noted that the valve 29 in the injection chamber 24 is in the nature of a check valve, and that the push rod 36 is of triangular section and permits of a flow of liquid from the injection chamber 24 into the mixing chamber 14 every time the valve 29 is unseated or opened.

In operation the machine functions as follows:

Assuming the machine to be suitably connected to a pressure water supply 26 and a source of electric energy for the operation of the electric motor 1, and that the cylindrical chamber 18 has been filled with a chemical, sterilizing solution and that the valve 53 in the water pressure line 26 has been opened, water will flow therefrom up through the pipe 25 into the injection chamber 24, thence into the pipe 23 and through the check valve 54 down to the spigot 20 through which the water passes into the rubber bladder 19 positioned within the cylindrical chamber 18.

As the bladder 19 can only be partially filled and distended by reason of the cylindrical chamber 18 being filled with a chemical solution, which prevents the distension and expansion of the bladder 19 to its fullest extent, the water pressure is soon equalized in the bladder 19 and pipe line 23 and injection chamber 24.

During the equalizing of the water pressure within the bladder 19, the distension of the same has set up an equalizing pressure upon the chemical solution within the cylindrical chamber 18 and this pressure has caused the solution to flow out therefrom through the needle valve 55 and pipe 27 into the injection chamber 24 until a state of equilibrium of pressure has been established, both inside and outside the bladder 19 within the chamber 18, and in the pipe lines 23, 25 and 27 and also in the injection chamber 24.

As pressure is set up within the injection chamber 24, the valve 29 is caused to seat by reason of the pressure set up upon the head of the valve stem 32 within the guide 33, which forces the valve 29 upon its seat 30.

As the valve 29 is forced upon its seat 30, it depresses the triangularly shaped push rod 36 upon the end 37 of the pivoted lever 38 and holds the latter down, which action raises the opposite end 41 of the lever 38 up against the bulbous end 44 of the push rod 42, and also raises the end 41 from out of contact with the switch lever 45 positioned below the lever 38, which operates the electric switch 47.

All the above actions have been automatic by reason of the water pressure acting upon the various parts of the machine.

Now, assuming the operator of the machine has a number of glasses to wash, one of the glasses is positioned upon the vertical brushes 9 and 10 and the glass is pressed downwards upon the upper end of the push rod 42 projecting above

the centre brush 10 with sufficient force to depress the rod 42 downwards.

This action depresses the end 41 of the lever 38 until it contacts with the switch-lever 45 and closes the switch 47 and starts the motor 1 and the brushes 9 and 10 revolving.

The movement of the lever 38 downward has unseated the valve 25 in the injection chamber 24 and permitted a flow of mixture therefrom into the mixing chamber 14, which is assumed to be full of a diluted antiseptic solution.

With the opening of the valve 29 a pressure is set up within the mixing chamber 14 which forces a flow therefrom up through the hollow bearing spindle 12 to the revolving brushes 9 and 10 and upon the inside and outside of the glass positioned thereon which is being washed.

The waste water discharged from the brushes into the bowl 15 is discharged through the outlet 16.

With the opening of the valve 29, the water pressure in the injection chamber 24 is momentarily reduced to the pressure in the mixing chamber 14, which is only that due to a very small hydraulic head of the water in the brush spindles 9 and 10. This slightly reduces the pressure in the cylindrical chamber 13, allowing the chamber to contract and force the chemical solution therefrom through needle valve 55 into the injection chamber 24. The back check valve 54 prevents the pressure in the chamber 13 from falling too rapidly when valve 29 is open and the pressure in 24 is consequently lowered.

If the push rod 42 is held down for a considerable period, it will bring down the pressure in the cylindrical chamber 13 to that in the injection chamber 24, and no solution will pass out therefrom through the needle valve 55 into the chamber 24, as water from the inside of the bladder 19 is prevented from backing up into the chamber 24 by reason of the check valve 54 in the line 23.

After the glass is washed and removed from the push rod 42, the valve 29 is automatically closed and water pressure restored in the injection chamber 24 and bladder 19.

The restoration of the full water pressure inside the bladder 19 exerts an equal pressure upon the antiseptic solution within the cylindrical chamber 13 and causes it to slightly expand and set up a pressure upon the solution contained therein to a sufficient degree that, when the pressure is momentarily lowered therewithin by opening the valve 29, the volume of the space surrounding the bladder 19 is reduced to a sufficient degree to force the antiseptic solution from chamber 13 into the injection chamber 24.

It is to be noted that, as the quantity of antiseptic solution is reduced within the cylindrical chamber 13, the quantity of water contained within the bladder 19 is proportionately increased, and this action is continued by the frequent washing of glasses until the chamber 13 is almost completely emptied of solution; but before this is finally effected, a warning is given in the gauge glass 49 by movement of the stem 50 therewithin, which has been caused by the expansion of the bladder 19 contacting the flat head 51 of the valve stem 50 which is positioned within the chamber 13 and forcing the stem 50 into the gauge glass 49 to indicate that the chamber 13 is nearly empty of solution.

A summary is as follows:

As noted above, the machine consists essentially of three chambers, a mixing chamber, an injection chamber and a solution chamber, that in effect comprises a pumping cylinder.

The machine depends for its action on the principle of expansion and contraction of materials under varying stresses.

The solution chamber is divided into two compartments by a rubber bladder. Outside of the bladder is a chemical solution for sterilizing the glasses.

Inside the bladder is water at a pressure exceeding fifty pounds per square inch when the machine is at rest.

The solution chamber is connected to the injection chamber by a pipe of small diameter.

The water pressure is connected to the injection chamber and exerts an equal pressure on the solution cylinder, bringing these into equilibrium and expanding the solution cylinder.

The injection chamber is connected to the inside of the bladder with a much larger pipe than the pipe connecting the injection chamber with the solution chamber and has a check valve therein which prevents pressure from the bladder being set up in the injection chamber.

The machine performs part of its functions, when not in operation, as the water pressure causes the solution chamber to expand and brings all fluids in the solution chamber, bladder and injection chamber to the same pressure.

When the machine is operated, the valve in the injection chamber is opened and allows the water and solution to enter the mixing chamber to pass up through the brushes and thence to the drain.

When the valve in the injection chamber is opened, it reduces the pressure therein to the pressure in the mixing chamber, which is very low by reason of its not being subjected to pressure when the machine is at rest.

Having now described my invention and the nature of the same, what I claim and desire to be protected in by Letters Patent, is:

1. In a machine, a mixing chamber having a discharge outlet, an injection chamber having a valved passage to said mixing chamber, a valve controlling said passage, means for unseating said valve, an expansible and contractible solution chamber, a duct between said solution chamber and said injection chamber, a valve with a restricted passage located in said duct, a duct from said injection chamber to said solution chamber and containing a back-check valve, and a water-supply pipe connected to deliver into said injection chamber at a predetermined pressure.

2. In a machine, a mixing chamber having a discharge outlet, an injection chamber having a valved passage to said mixing chamber, a valve controlling said passage, means for unseating said valve, an expansible and contractible solution chamber, a duct between said solution chamber and said injection chamber, a valve with a restricted passage located in said duct, a duct from said injection chamber to said solution chamber and containing a back-check valve, a water-supply pipe connected to deliver into said injection chamber at a predetermined pressure, and a bladder in said solution chamber into which bladder said last named duct delivers its contents.

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